PATENT
(Docket No. IN-9511)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Koichi TAKAMURA et al.

Serial No.: 09/965,076

Filed: September 27, 2001

For: Method of Adding Water Insoluble Organic Chemicals to Styrene-Butadiene Rubber Latex Dispersions and Resulting Styrene-Butadiene Rubber Latex Dispersions

Group Art Unit: 1714

Examiner: Peter A. Szekely

I hereby certify that the attached correspondence is being transmitted via facsimile addressed to Commissioner for Patents, PO BOX 1450, Alexandria, VA 22313-1450, on the date shown below to the TC1700 Before Final facsimile number at 1-703-872-9310.

August 14, 2003
Date

Marjorie Ellis

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

RESPONSE TO OFFICE ACTION

In response to the Office Action mailed on May 30, 2003, Applicants respond through their attorney as follows.

IN THE CLAIMS

1. (Currently amended) A method of incorporating a water insoluble organic chemical into a styrene-butadiene rubber latex dispersion, comprising the steps of:
providing a styrene-butadiene rubber latex dispersion comprising an aqueous phase and a disperse phase, said disperse phase comprising particles of styrene-butadiene rubber;
adding an organic solvent that is miscible in water to the styrene-butadiene rubber latex dispersion; and
adding a water insoluble organic chemical to the styrene-butadiene rubber latex dispersion;
whereby the addition of said organic solvent allows the water insoluble organic chemical to pass from the aqueous phase into the disperse phase thus limiting separation of the water insoluble organic chemical from the latex dispersion, wherein the organic solvent is present in an amount that is less than 5% by weight based on the weight of the latex polymer, and wherein the water insoluble organic chemical is at least one of a vulcanizing agent, a vulcanization accelerator, a prevulcanization inhibitor, an antireversion agent, and an antioxidant.

2. (Original) The method according to Claim 1, wherein said adding steps comprise combining the organic solvent and the water insoluble organic chemical and adding the organic solvent and the water insoluble organic chemical together into the polymer dispersion.

3. (Original) The method according to Claim 1, wherein said step of adding an organic solvent comprising adding an organic solvent selected from the group consisting of C1-C3 alcohols, acetone, dioxane, methyl ethyl ketone (MEK) and N-methyl-2-pyrrolidone (NMP).

4. (Original) The method according to Claim 1, wherein said step of adding an organic solvent comprising adding an organic solvent selected from the group consisting of acetone and N-methyl-2-pyrrolidone (NMP).

5. (Original) The method according to Claim 1, wherein said providing step comprises preparing a styrene-butadiene rubber latex dispersion by polymerizing monomers consisting essentially of styrene, butadiene and optionally acrylonitrile.

6. (Original) The method according to Claim 1, wherein said providing step comprises providing a non-functionalized styrene-butadiene rubber latex dispersion.

7. (Original) The method according to Claim 1, wherein said providing step comprises preparing a styrene-butadiene rubber latex dispersion by polymerizing styrene and butadiene monomers at a temperature less than or equal to about 25°C.

8. (Original) The method according to Claim 1, wherein said providing step comprises preparing a styrene-butadiene rubber latex dispersion by polymerizing styrene and butadiene monomers in the presence of a natural soap.

9. (Original) The method according to Claim 8, wherein said preparing step includes a natural soap selected from the group consisting of sodium or potassium oleate and the sodium or potassium salt of rosin acid.

10. (Original) The method according to Claim 1, wherein the providing step comprises providing a styrene-butadiene rubber latex dispersion having a total solids content of at least 65% by weight.

11. (Original) The method according to Claim 1, wherein said step of adding a water insoluble organic chemical comprises adding the solid water insoluble organic chemical as a solid.

12. (Original) The method according to Claim 1, wherein said step of adding a water insoluble organic chemical comprises adding the water insoluble organic chemical as an aqueous dispersion.

13. (Canceled)

14. (Original) The method according to Claim 1, wherein said step of adding an organic solvent comprises adding an organic solvent with a boiling point of less than about 85°C.

15. (Original) The method according to Claim 14, further comprising the step of removing the organic solvent from the latex dispersion.

16. (Original) The method according to Claim 1, wherein said step of adding an organic solvent comprises adding an organic solvent with a boiling point of greater than about 180°C.

17. (Currently Amended) A styrene-butadiene rubber latex dispersion, comprising:
an aqueous phase;
a disperse phase comprising styrene-butadiene rubber latex particles;
an organic solvent that is miscible in water; and
a water insoluble organic chemical;
wherein substantially all of the water insoluble organic chemical is provided in said disperse phase, wherein the organic solvent is present in an amount that is less than 5% by weight based on the weight of the latex polymer, and wherein the water insoluble organic chemical is at least one of a vulcanizing agent, a vulcanization accelerator, a prevulcanization inhibitor, an antireversion agent, and an antioxidant.

18. (Original) The styrene-butadiene rubber latex dispersion according to Claim 17, wherein at least 90% of said water insoluble organic chemical is provided in said disperse phase.

19. (Original) The styrene-butadiene rubber latex dispersion according to Claim 17, wherein a substantial portion of said organic solvent is in said disperse phase.

20. (Original) The styrene-butadiene rubber latex dispersion according to Claim 19, wherein at least 50% of said organic solvent is in said disperse phase.

21. (Original) The styrene-butadiene rubber latex dispersion according to Claim 17, wherein the organic solvent is selected from the group consisting of C1-C3 alcohols, acetone, dioxane, methyl ethyl ketone (MEK) and N-methyl-2-pyrrolidone (NMP).

22. (Original) The styrene-butadiene rubber latex dispersion according to Claim 17, wherein the organic solvent is selected from the group consisting of acetone and N-methyl-2-pyrrolidone (NMP).

23. (Original) The styrene-butadiene rubber latex dispersion according to Claim 17, wherein the styrene-butadiene rubber latex particles are derived from monomers consisting essentially of styrene, butadiene and optionally acrylonitrile.

24. (Original) The styrene-butadiene rubber latex dispersion according to Claim 17, wherein the styrene-butadiene rubber latex particles are non-functionalized styrene-butadiene rubber latex particles.

25. (Original) The styrene-butadiene rubber latex dispersion according to Claim 17, further comprising a natural soap.

26. (Original) The styrene-butadiene rubber latex dispersion according to Claim 25, wherein the natural soap is selected from the group consisting of sodium or potassium oleate and the sodium or potassium salt of rosin acid.

27. (Original) The styrene-butadiene rubber latex dispersion according to Claim 17, having a total solids content of at least 65% by weight.

28. (Canceled)

29. (Original) The styrene-butadiene rubber latex dispersion according to Claim 17, wherein the organic solvent has a boiling point of less than about 85°C.

30. (Original) The styrene-butadiene rubber latex dispersion according to Claim 17, wherein the organic solvent has a boiling point of greater than about 180°C.

31. (Canceled)

32. (Original) The styrene-butadiene rubber latex dispersion according to Claim 17, including less than 2% by weight of the organic solvent based on the weight of the latex polymer.